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Striker, latch housing and locking mechanism for a vehicle door.

A striker (33) for a vehicle door locking mechanism comprises a head (59) providing a base (65) and sloping sides (74,81) symmetrically tapered in at least two directions towards an apex (79) directed to enter a latch housing (43). The striker has a shank (73) for mounting the striker on the vehicle body. The latch housing (43) comprises a body (45) and a movable female portion (51) fitting telescopically inside the body (45). The female portion (51) is shaped to receive the striker head (59), and slides into the housing body (45) only when the striker head (59) is completely seated within the female portion (51). The latch mechanism has a ratchet (77) which engages the striker (33) and a pawl (83) which engages one leg (77a) of the ratchet (77) when the door is lightly closed and another leg (77b) of the ratchet (77) when the door is fully closed. A resilient block (87), which restricts movement of the female portion (51) into the housing body (45), is compressed as the striker head (45) moves into the housing (43), to allow the pawl (83) to engage the second leg (77b) of the ratchet (77) and then expands to ensure that the pawl (83) properly engages the ratchet (77). Several alternative embodiments of striker, tapered in one or two directions, are described.

FIG.3.

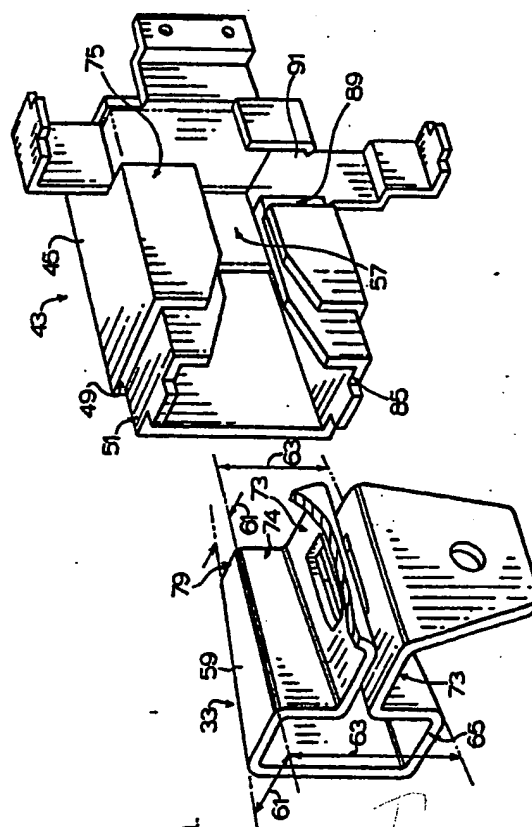


FIG.3a.

FIELD OF INVENTION

This invention relates to an improved vehicle door lock double tapered striker and housing therefor and various single tapered strikers.

BACKGROUND OF INVENTION

It is desirable when designing a lock for a vehicle door to provide a mechanism which will ensure the complete locking engagement of a ratchet with a striker when the door is closed, and which will lessen the possibility of the door becoming unlatched, for example in a collision. It is desirable as well, to design a mechanism which will not be functionally disabled by a collision such that after a collision it is still possible to unlatch the door permitting passengers to leave the vehicle.

It is known that in some instances that during particularly a frontal or side collision the shock of the collision may cause a side door normally in a closed position to buckle and separate from the body of the vehicle in a lateral direction relative to the length of the vehicle. In some instances the extent of such lateral force is sufficient only to urge the engagement surface of a ratchet normally engaging the striker, laterally against the striker. If the ratchet is not secured in a primary engagement position as for example by a detent projecting from a pawl, then such minor lateral forces may be sufficient to pivot the ratchet releasing the striker causing the door to fly open.

In more serious collisions, it is known that force transmitted laterally relative to the length of the car tends to cause the doors to fly open if transferred to the locking engagement of the ratchet with the striker, possibly deforming the ratchet sufficiently to break and thereby release the striker. The resultant unresolved twisting tends to rotate the ratchet in a plane which is not perpendicular to the axis of the striker, thereafter binding such an engagement and preventing normal opening of the door.

In the most common vehicle door latch design wherein the striker comprises a substantially cylindrical shank having a head of extended diameter at the end thereof, the head portion and shank sliding into a horizontally extending slot disposed within the door closed at one end, the ratchet encouraged to rotate by said striker, thereby engaging the shaft behind the head of the striker and thereby preventing the striker from exiting the slot. However, the latch does not rigidly hold the door closed as there is a certain amount of free play resulting in rotating of the door in time. Such rotational forces are usually not in a single plane, and the tendency during a collision is for either the head of the

striker to partially or totally shear away from the locking engagement with the ratchet or the ratchet will bend, buckle and twist, thereby disabling the mechanism. Examples of such "pin" type vehicle door locks may be seen in United States Letters Patent Nos. 3,674,296; 4,130,308; 4,357,039; 4,358,141 and 3,367,699.

In an effort to compensate for the rotation of the ratchet relative to the striker in a collision it is known to provide a striker having a structure which is tapered in one axis. Such a "wedge shaped" striker is mounted on a vehicle pillar. The wedge shape is generally horizontally inclined with the smaller cross section of the wedge leading the advance of the striker into a slot for engagement thereof with a ratchet. An example of a wedge shaped striker may be seen in United States Letters Patent 4,165,112 and 4,219,227. As appears from United States Patent 4,219,227 a ratchet engages a depression in the wedge shaped striker. As appears from United States Patent 4,165,112 the striker has a hole through it, through which a leg of a U shaped ratchet passes when the mechanism is engaged. It will be appreciated by those skilled in the art that such an arrangement would tend to prevent rotation of the striker in relation to the housing therefor.

Further it will be appreciated by those skilled in the art that proper engagement of the ratchet with the hole in the striker is very necessary. To this end, such a mechanism requires careful design and installation which ensure in continuous use that when the door is closed, the ratchet will be aligned with the hole in the striker for engagement therewith. Various bumpers, guides and elastomeric devices have been proposed to assist such an alignment. In United States Patent 4,219,227 and in an older United States Patent, 3,858,919 a cone shaped pin is mounted in the slot receiving the door striker. The door striker has a cone shaped recess which slidably fits over the cone shaped pin when the door striker is engaged in the slot for locking. It will be appreciated by those skilled in the art that while the foregoing mechanisms may provide for proper alignment with the aid of bumpers, elastomeric devices and shims during installation. Further such a device may assist in reducing rotation in a plane perpendicular to the axis of the door striker. However the mechanism will still permit longitudinal separation of the striker from the slot in a longitudinal direction in for example the axis of the striker extending away from the pillar generally in the lengthwise direction of the car. Furthermore, because of the design tolerances required it is likely that any deformation of the lock-

ing mechanism components concomitant with a collision will cause jamming, resulting in difficulty for a passenger to release the locking mechanism in order to leave the car.

It is known in the art to provide an engagement between a striker and a slot for receiving the striker which will resist the longitudinal separation of the striker from the slot for receiving same. For example, United States Patents Nos. 1,192,733 and 2,100,591 disclose a "hook shaped" striker. The hook or projection of the striker fits into a slot which is generally U-shaped and surrounds the hook, thereby preventing longitudinal separation. In the latter patent 2,100,591, a bolt slides internally of the U-shaped slot for engaging a corresponding aperture in the hook. In this manner, the hook cannot slide out of the recess.

In United States Patent 2,758,864 a locking mechanism is disclosed wherein the striker is generally T-shaped in cross section and may be slidably keyed into a slot having the same T-shaped cross section. The leading edge of the striker having a T-shaped cross section is formed with a cam surface for displacing a spring biased latch bolt which may slidably enter the slot. When the door is closed the cam surface of the striker raises the latch bolt. The latch bolt passes over the striker to the back of the striker and blocks its exit from the slot. It will be appreciated by those skilled in the art that such an arrangement is similar in principle to the traditional arrangement of a striker pin engaging a pivotable ratchet which once engaged blocks the exit of the striker pin from the slot.

In United Kingdom Patent 239,691 there is provided a latching mechanism for use in a motor vehicle wherein the "striker" slidably engages a slot in a latch housing. The striker is of a generally T shaped cross-section --the head of the striker is tapered in two directions, being wider at the base than the leading edge and has a transverse taper from the base at the back, to the front. The neck of the striker is also tapered, being wider proximate the base than the leading edge. The slot is tapered in two directions comprising a V-shaped taper matching that of the neck of the striker and a transverse taper matching the transverse taper of the head of the striker. The combination of the transverse taper of the striker head and the transverse taper of the slot draws the striker and the latch housing together when placed in engagement. It will be appreciated by those skilled in the art that the transverse taper is not symmetrical. Exact alignment of the striker with the slot is therefore required during design and installation thereof.

In United States Patent 4,466,645 a U-shaped striker is disclosed having a part covered by a mould-formed plastics material, the portion of which carried at the juncture of one corner of the

horizontal connector and leg which is pushed into a door latch being thick r, to present a columnar shape.

It is therefore an object of this invention to provide a resiliently biased vehicle door locking mechanism which will provide for the broader tolerance engagement of a striker in a latch housing therefor.

It is a further object of this invention to provide a vehicle door locking mechanism which will ensure the complete engagement of a ratchet with a striker when the door is normally closed, thereby avoiding the unintentional opening of a door.

It is a further object of this invention to provide a vehicle locking mechanism which will evenly distribute the load in a collision, thereby avoiding the forced opening of a door in a collision, by resolving any forces upon the mounting members of the ratchet mechanism and not upon the ratchet mechanism itself.

It is a further object of this invention to provide a vehicle locking mechanism better adapted to withstand collision, whereby the ability of passengers to unlatch the door after a collision will be facilitated.

It is a further object of this invention to provide improved strikers of simple construction yet effective for use in a locking mechanism.

Further and other objects of this invention will be apparent to those skilled in the art from the following summary of the invention and detailed description thereof.

SUMMARY OF INVENTION

According to one aspect of the invention there is provided a striker for a vehicle door locking mechanism, the striker comprising a head providing a base and sloping sides symmetrically tapered in at least two directions towards an apex directed to enter a latch housing; the striker having a shank for mounting the striker, the shank extending away from the striker head, preferably laterally away from one side of the striker head for sliding engagement with a slot extending longitudinally along one side of a latch housing.

According to a preferred embodiment of the invention the striker head providing a base and sloping sides symmetrically tapered in at least two directions towards an apex is of a generally frustum trapezoidal configuration.

According to another aspect of the invention there is provided a latch housing for a vehicle door locking mechanism, the latch housing comprising a body having at least one side open of a configuration for receiving a movable female portion of compatible configuration; the movable female portion

having an external configuration suitable for fitting telescopically inside the opening in the latch housing and being reversably slideable therein, the movable female portion having an inside surface of a configuration matching the configuration of a striker head and suitable for surrounding the striker head at least about 360°, the movable female portion suitable for receiving a striker head in a tolerance fit, the latch housing having a means for limiting the slideable retraction of the movable female portion into the latch housing and limiting the extension of the movable female portion out of the latch housing; whereby the movable female portion suitable for receiving the striker head in a tolerance fit is only slideable for linear movement in the latch housing when a striker head is completely seated in the female portion.

According to a preferred embodiment of the invention the latch housing comprises a body having at least one side open of a configuration for receiving a movable female portion of compatible configuration and one side perpendicular to the said opening having a slot extending longitudinally suitable for slideably receiving the shank of a striker; the movable female portion having an external configuration suitable for fitting telescopically inside the opening in the latch housing and being reversably slideable therein, the movable female portion having an inside surface of a configuration matching the configuration of a striker head and suitable for surrounding the striker head at least about 360°, the movable female portion having a slot extending longitudinally on one side parallel and adjacent to the slot on one side of the latch housing for slideably receiving the shank of the striker, the movable female portion suitable for receiving the striker head in a tolerance fit, the latch housing having a means for limiting the slideable retraction of the movable female portion into the latch housing and limiting the extension of the movable female portion out of the latch housing; whereby the movable female portion suitable for receiving the striker head in a tolerance fit is only slideable for linear movement in the latch housing when a striker head is completely seated in a female portion.

According to another aspect of the invention there is provided a vehicle door locking mechanism for releasably locking a vehicle door in a closed position, the mechanism comprising:

a) a striker securely mounted on either of a pillar or a door, suitable for slideably engaging a latch housing; the striker having a head providing a base and sloping sides symmetrically tapered in at least two directions, towards an apex directed to enter a latch housing; the striker having a shank for mounting the striker, the shank extending away from the striker head, preferably laterally away

from one side of the striker head for sliding engagement with a slot extending longitudinally along one side of a latch housing;

b) a latch housing securely mounted on either of a pillar or a door, suitable for slideably receiving the striker of (a); the latch housing comprising a body having at least one side open of a configuration for receiving a movable female portion of compatible configuration; the movable female portion having an external configuration suitable for fitting telescopically inside the opening in the latch housing and being reversably slideable therein, the movable female portion having an inside surface of a configuration matching the configuration of the striker head and suitable for surrounding the striker head at least about 360°, the movable female portion suitable for receiving the striker head in a tolerance fit, the latch housing having a means for limiting the slideable retraction of the movable female portion into the latch housing and limiting the extension of the movable female portion out of the latch housing;

c) ratchet means for engaging the striker suitable for locking the striker inside the latch housing and suitable for releasing the striker for permitting the slideable movement of the striker out of the latch housing.

Preferably the door locking mechanism for releasably locking a vehicle door in a closed position comprises:

a) a striker securely mounted on either of a pillar or a door, suitable for slideably engaging a latch housing; the striker having a head providing a base and sloping sides symmetrically tapered in at least two directions, towards an apex directed to enter a latch housing; the striker having a shank for mounting the striker, the shank extending away from the striker head, preferably laterally away from one side of the striker head for sliding engagement with a slot extending longitudinally along one side of a latch housing;

b) a latch housing securely mounted on either of a pillar or a door, suitable for slideably receiving the striker of (a); the latch housing comprising a body having at least one side open of a configuration for receiving a movable female portion of compatible configuration and one side perpendicular to the said opening having a slot extending longitudinally suitable for slideably receiving the shank of the striker; the movable female portion having an external configuration suitable for fitting telescopically inside the opening in the latch housing and being reversably slideable therein, the movable female portion having an inside surface of a configuration matching the configuration of the striker head and suitable for surrounding the striker head at least about 360°, the movable female portion having a slot extending longitudinally one

side parallel and adjacent to the slot on one side parallel and adjacent to the slot on one side of the latch housing for slideably receiving the shank of the striker, the movable female portion suitable for receiving the striker head in a tolerance fit, the latch housing having a means for limiting the slideable retraction of the movable female portion into the latch housing and limiting the extension of the movable female portion out of the latch housing;

c) ratchet means for engaging the striker suitable for locking the striker inside the latch housing and suitable for releasing the striker for permitting the slideable movement of the striker out of the latch housing.

Preferably the latch housing comprises a body having an opening for access to a generally rectangular internal configuration for receiving a movable female portion of compatible configuration comprising a generally rectangular external configuration suitable for fitting telescopically inside the opening in the latch housing and being reversably slideable therein.

Preferably the movable female portion has an inside configuration of a generally frustum trapezoidal configuration matching the frustum trapezoidal shape of the striker head in a preferred embodiment.

Preferably the ratchet means for engaging the striker is suitable for locking the striker inside the latch housing only when the striker head is completely seated in the movable female portion whereby the movable female portion of the latch housing when struck by the striker only slides into the latch housing when the striker head is completely seated therein, thereby providing tolerance for the engagement of the striker head inside the movable female portion and alignment of the ratchet means with the striker.

Preferably where the shank of the striker extends laterally away from one side of the striker head for sliding engagement with a slot extending longitudinally along one side of a latch housing, the shank of the striker comprises a hole directed therethrough suitable for receiving at least one leg of a ratchet, for releasably locking the striker inside a latch housing.

According to a preferred embodiment of the invention the means for limiting the slideable retraction of the movable female portion into the latch housing comprises resilient biasing means suitable for absorbing the kinetic force of the striker when moving the female portion in a linear direction upon closure of the door and suitable for causing the movable female portion to thereafter recoil.

According to a preferred embodiment of the

invention there is provided a vehicle door locking mechanism for releasably locking a vehicle door in a closed position, the mechanism comprising:

a) a striker securely mounted on either of a pillar or a door, suitable for slideably engaging a latch housing; the striker having a head symmetrically tapered in at least two directions, of a generally frustum trapezoidal configuration having an apex directed towards a latch housing; the striker head having a shank for mounting the striker, the shank extending laterally away from one side of the striker head for sliding engagement with a slot extending longitudinally along one side of a latch housing;

b) a latch housing securely mounted on either of a pillar or a door, suitable for slideably receiving the striker of (a); the latch housing comprising a body of a generally rectangular internal configuration having at least one side open for receiving a movable female portion and one side perpendicular to the said opening having a slot extending longitudinally suitable for slideably receiving the shank of the striker; the movable female portion having a generally rectangular external configuration suitable for fitting telescopically inside the opening in the latch housing and being reversably slideable therein, the movable female portion having an inside surface of a generally frustum trapezoidal configuration matching the configuration of the striker head suitable for surrounding the striker head at least about 360° and having a slot extending longitudinally on one side parallel and adjacent to the slot on one side of the latch housing for slideably receiving the shank of the striker, the movable female portion suitable for receiving the striker head in a tolerance fit and being slideable for linear movement in the latch housing only when the striker head is completely seated in the female portion, the latch housing having a means for limiting the slideable retraction of the movable female portion into the latch housing and limiting the extension of the movable female portion out of the latch housing;

c) ratchet means for engaging the striker suitable for locking the striker inside the latch housing only when the striker head is completely seated in the movable female portion and suitable for releasing the striker for permitting the slideable movement of the striker out of the latch housing;

d) whereby the movable female portion of the latch housing when struck by the striker only slides into the latch housing when the striker head is completely seated therein thereby providing tolerance for the engagement of the striker head inside the movable female portion and alignment of the ratchet means with the striker.

According to another aspect of the invention, a striker is provided comprising two portions (for

example, rectangular in shape) each having two opposed end edges and carrying a mounting aperture and a latch receiving aperture for receiving a latch, the two portions each being bent intermediate their end edges and disposed normal (substantially 90 degrees) to one another, at least one of the portions in the area between the edge of the latch-receiving aperture remote the bend and closer end edge to the latch-receiving aperture is bent laterally (for example, curved laterally) in a direction away from the plane of the bent portion containing the latch-receiving aperture in a direction parallel the portion containing the mounting aperture whereby when the two portions containing the latch receiving aperture are aligned and joined together along a joint, the end of the striker provides at least one laterally-extending portion tapering towards an apex.

According to another aspect of the invention, the striker may provide two unsymmetrical laterally-extending portions tapering towards an apex.

According to another aspect of the invention, the striker may provide two symmetrical laterally-extending portions tapering towards an apex directed for centering in a latch housing.

According to another aspect of the invention, an intermediate portion of the bent or curved portions may be parallel to the joint.

According to another aspect of the invention, an intermediate portion of the bent or curved portion may be V-shaped directed away from the joint.

According to another aspect of the invention, the bent or curved portions of the striker may carry portions which do not engage the latch housing when inserted therein to minimize forces required to insert the striker into the latch housing.

According to another aspect of the invention, a striker is provided comprising two rectangular portions each having two opposed end edges and carrying a mounting aperture and a latch-receiving aperture for receiving a latch, the two rectangular portions each being bent intermediate their end edges and disposed normal (substantially 90 degrees) to one another, the portion between the edge of the latch-receiving aperture remote the bend and closer end edge to the latch-receiving aperture is curved laterally in a direction away from the plane of the bent portion containing the latch-receiving aperture in a direction parallel the portion containing the mounting aperture whereby when the two portions containing the latch-receiving aperture are aligned and joined together, the end of the striker provides two symmetrical laterally-extending curved portions tapered towards an apex directed for centering in a latch housing.

According to another aspect of the invention the bent or curved portion is tapered from a wider

section to a narrower portion towards the apex provided for entering a latch housing.

According to another aspect of the invention, the bent or curved portions are tapered in two directions.

According to another aspect of the invention, the striker may be covered by a compressible moulded plastics material.

According to another aspect of the invention, the striker may comprise a U-shaped rod comprising a pair of legs anchored to a base and a connector rod connecting the legs, the connector and portions of the upper ends of the legs connected to the connector being covered by a compressible moulded plastics material, the covered portion presenting two sides tapered in at least one direction towards an apex directed to entering a latch housing. Preferably, the at least two sides taper in at least two directions towards an apex directed to entering a latch housing.

According to another aspect of the invention, the striker may comprise a pair of legs anchored to a base and a flattened top connector connecting the legs, the flattened top connector to present at least two sides tapered in at least one direction towards an apex directed to enter a latch housing.

According to another aspect of the invention, each of the legs may be covered by a plastic bushing.

According to another aspect of the invention, the flattened top may be deeply drawn or cold formed to provide thick sides which are tapered in at least the two directions.

According to another aspect of the invention, the striker may comprise a pair of legs anchored to a base and a flattened connector wire connecting the legs, the flattened connector wire to present at least two sides symmetrically tapered in at least one direction towards an apex directed to entering a latch housing. Preferably, the flattened connector is symmetrically tapered in at least two directions towards an apex directed to entering a latch housing.

According to another aspect of the invention, a striker is provided to present two sides symmetrically tapered in at least two directions towards an apex directed for entering a latch housing.

According to another aspect of the invention, a striker is provided to present a compressible plastics portion presenting two sides symmetrically tapered in at least one direction (and preferably two directions) towards an apex.

According to another aspect of the invention, a striker comprising a generally U-shaped rod anchored to a base is provided with at least a portion of the U-shaped rod being conically tapered, thereby presenting two sides tapering in two directions towards an apex directed for entering a latch housing.

ing in one embodiment the conical tapering extending from one end to the other end of the U-shaped rod.

According to still another aspect of the invention, a striker is provided comprising a generally U-shaped rod anchored to a base, at least a portion of the U-shaped rod carrying an elongated wedge portion, in one embodiment the elongated wedge portion extending from one end to the other end of the U-shaped rod.

According to another aspect of the invention, a striker is provided comprising two rectangular portions, each having two opposed end wedges and carrying a mounting aperture and latch receiving aperture, the two rectangular portions each being bent intermediate its end edges and disposed normal to one another, the two portions containing the latch-receiving aperture being aligned and joined together, the said two portions at least partially encapsulated by material (for example Mastics material) to present a wedge shaped portion for tapering towards an apex directed for entering a latch housing, in one embodiment the encapsulated material presenting two sides symmetrically tapered in at least two directions towards the apex.

According to another aspect, the apex of the tapered wedge shaped portion of the striker carries compressible moulded plastics material for noise reduction purposes.

According to another aspect of the invention, a one-piece striker made from one sheet of material is provided, the striker comprising a mounting plate carrying a pair of mounting apertures therethrough and an upstanding latch-receiving formation, the formation comprising a latch-receiving aperture therethrough, one end being wider than the other end to provide at least one wedge portion tapering towards an apex directed for centering a latch housing and for securing the latch to the striker, in one embodiment the at least one wedge portion comprises a pair of wedge portions each tapering towards the apex and preferably the striker is made from a single plate extending longitudinally, wherein an edge portion is bent to a position normal to the plate, the plate then being cut intermediate its ends from the edge opposite the bent portion to proximate the bent portion bending the ends of the bent edge portion together to form the at least one wedge portion and securing the ends together (as for example by welding).

The invention will now be illustrated with reference to the following drawings of an embodiment of the invention and detailed description thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of a right vehicle door comprising a striker mounted on a pillar and a slot in a door mounted latch housing for receiving the striker.

Figure 2 is an exploded perspective view of a latch housing (for a right door) having a resiliently biased movable female portion, and ratchet and panel mechanism for engaging a striker.

Figure 3 is a perspective view of the assembled latch housing in Figure 2 including a view in Figures 3a of a symmetrically tapered striker for sliding into the latch housing.

Figure 4 is a perspective view of a striker tapered in one direction.

Figure 5 is a perspective view of a striker as known in the prior art.

Figure 6 is a top view of the striker in Figure 4.

Figure 7 is a perspective view of another striker tapered in two directions, in one embodiment.

Figure 8 is a schematic side view of the striker and latch housing in Figure 3 comprising a ratchet and pawl.

Figure 9 is a view of the striker and latch housing in Figure 8 wherein the striker is in a partially seated position.

Figure 10 is an end view (in schematic form) of the striker entering the movable female portion of the latch housing, in symmetrical alignment therewith.

Figure 11 is an end view (in schematic form) of the striker and movable female portion in Figure 10, in asymmetrical alignment.

Figure 12, comprising Figures 12a, 12b, and 12c is an end view of the striker seated in the latch housing, demonstrating the load bearing qualities of the locking mechanism when the movable female portion surrounds the striker head at least about 360°.

Figure 13 is a schematic side view of the striker and latch housing in Figures 3, 8 and 9; comprising Figures 13a, 13b, 13c and 13d demonstrating the locking sequence, in one embodiment.

Figure 14 is a schematic side view of the striker and latch housing in Figures 3, 8 and 9; comprising Figures 14a, 14b, 14c, 14d and 14e demonstrating the locking sequence, in an alternative embodiment.

Figures 15 and 16 are views of a striker covered by plastics material and having two sides symmetrically tapered in one direction towards an apex.

Figure 17 is a side view of a striker covered with moulded plastics material presenting two sides tapered in two directions towards an apex for entering a latch housing.

Figures 18 and 19 are top and side views of a flattened wire striker two sides of which are symmetrically tapered in at least one direction towards an apex.

Figures 20 and 21 are side and top views of a conically-shaped striker presenting at least two sides tapered in two directions towards an apex for entering a latch housing.

Figures 22 and 23 are side and top views of a tapered wire striker, two sides of which are symmetrically tapered in at least one direction towards an apex.

Figures 24 and 25 are side and top views of a striker similar to that shown in Figure 4 whereat the tapering is provided by a moulded-on wedge from plastics material.

Figures 26 and 27 are top and side views of a striker tapered with moulded-on bushing from plastics material at the apex of the striker.

Figures 28, 29 and 30 are top end and side views respectively of a tapered striker manufactured from one sheet of material.

Figures 31A and 31B are top and side views of a tapered striker comprising a tapered plate.

Figures 32 and 33 are side views of two strikers carrying "thicker" tapered portions.

Figure 34 is a top view of a striker having portions tapered in one direction.

Figures 35 and 36 are top views of a striker having different tapering portions.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

With reference to Figure 1 there is shown the right side of a vehicle 31, comprising a symmetrically tapered striker 33 mounted on a pillar 35 and slot 37 in the end face 39 of a door 41. The slot 37 comprises one element of a latch housing 43 (best seen in Figures 2 and 3) for receiving the striker 33.

Referring to Figures 2 and 3 there is shown a latch housing 43 suitable to be mounted to the inside surface of the end face 39 of a right door 41. It will be appreciated that the mirror image of the striker 33 and latch housing 43 shown would be suitable for a left door.

The latch housing 43 has a body 45 of a generally rectangular internal configuration 47. One end 49 of the latch housing body 45 is open for receiving a movable female portion 51. The movable female portion 51 has a generally rectangular external configuration matching the internal con-

figuration 47 of the latch housing body 45, suitable for fitting telescopically inside the body 45. Both the latch housing body 45 and the movable female portion 51 have a slot 53,55 (respectively) extending longitudinally on one side. When the movable female portion 51 is fitted inside the latch housing body 45 (best seen in Figure 3) the slots 53,55 are aligned parallel and adjacent one 53 to the other 55 to form a single slot 57.

Referring to Figure 3a there is shown a preferred embodiment of the striker 33, having a head 59 which is symmetrically tapered in two directions 61,63, of a generally frustum trapezoidal configuration. All that is necessary is that the height 63 and width 61 of the striker 33 is symmetrically tapered and are greater proximate the base 65 than proximate the apex 67. Referring to Figure 7 there is shown another embodiment of the striker, having a head 59 which is symmetrically tapered in two directions 61,63 of a generally trapezoidal though not frustum configuration.

The striker shown in Figures 3a and 7 may be compared to that known in the prior art as depicted in Figure 5. Figure 5 depicts a striker 69 having no tapering whatsoever.

Figures 4 and 6 show a striker 71 tapered in one vertical direction 63 to an apex. The walls 71a, 71b of the striker 71 oriented in the horizontal axis are parallel one 71a to the other 71b.

Striker 71 comprises two rectangular portions 71c and 71d bent at 71e and 71f intermediate its ends and joined together presenting latch-receiving aperture 200 and mounting apertures 202 and 204. Walls 71a and 71b have been stamped in a manner to provide two symmetrically laterally extending curved stamped portions tapered towards apex 206 (directed for entering a latch housing). The striker shown in Figure 7 is similar in construction to the striker in Figure 4 except that two sides of the striker are symmetrically tapered in another direction as shown, towards apex 206.

Referring to Figures 2 and 3 the movable female portion 51 has an inside surface 51a of a generally frustum trapezoidal configuration matching the configuration of the striker head 59. As appears from Figure 3a, in the particular embodiments shown the striker 33 has a shank 73 extending laterally away from one tapered side 74 of the head 59; the shank 73 for mounting the striker 33 on either of a pillar 35 or a door 41. When the striker 59 is seated in the cavity 51a of the movable female portion 51, the shank 73 is slidably received in the slot 57 extending longitudinally on one side 75 of the latch housing 43. In an alternative embodiment (not shown) the shank 73 for mounting the striker 33 may extend laterally away from the base 65 of the striker 33, thereby eliminating the need for the longitudinally extending slot

57. All that is necessary is that the cavity 51a of the movable female portion 51 surround the striker head 59 at least about 360° when the striker 59 is seated therein.

With reference to Figures 8, 9, 10 and 11, normally when the door 41 is closed the striker 33 slides into the cavity 51a of the movable female portion 51. In the embodiment shown the shank 73 advances the ratchet 77 upon contact therewith as the striker head 59 is seated in the cavity 51a. It will be appreciated that in the vehicle door locking mechanism tolerance in the fit between the striker 33 and the cavity 51a facilitates the engagement of striker 33 with the latch housing 43. As appears from Figures 3a and 10, symmetrical alignment of the apex 79 portion of the striker head 59 with the cavity 51a is possible. Where symmetrical alignment of apex 79 portion of the striker head 59 with the cavity 51a is lacking, as depicted in Figures 9 and 11, seating engagement of the striker head 59 in the cavity 51a is nonetheless possible since tolerance is provided between the symmetrically tapered sides 74 of the striker head 59 proximate its apex 79 and the symmetrically taper walls 81 (as in Figures 8, 9, 10 and 11) of the cavity 51a. The compatible configuration of the striker head 59 and the cavity 51a defined by its walls 81 (in the preferred embodiment shown having a generally frustum trapezoidal configuration) guides the striker head 59 into a fully seated position (best seen in Figures 12, 13 and 14).

With reference to Figure 9, even in a partially seated position the shank 73 advances the ratchet 77 sufficiently to engage one leg 77a of the ratchet 77 with the pawl 83 for locking in a secondary position --as for example when the door 41 is lightly closed.

With reference to Figure 13, in one embodiment normally when the door 41 is ajar the movable female portion 51 proximate its end portion 85 is substantially flush with the end 49 of the latch housing body 45. A compressible rubber block 87 is provided for, inter alia, maintaining the normal position of the movable female portion 51. Preferably a detent member 89 (only seen in Figures 2 and 3) projects into a slot 91 in the latch housing body and is movable within the limits of the slot 91 to limit the extension of the movable female portion 51 out of the latch housing body 45 and to limit the retraction of the movable female portion 51 into the latch housing body 45. When the striker head 59 enters the cavity 51a asymmetrically as depicted in Figure 13b, it is guided by the tapered walls 81 into a fully seated position as depicted in Figure 13c. Because the striker 33 is guided by the tapered walls 81 a predetermined fit is provided and the leading edge 93 of the shank 73 will advance the ratchet 77 a predetermined amount as seating

progresses.

The shank 73 has a hole 95 therethrough for receiving the locking leg 77b of the ratchet 77. Referring to Figures 13c and 13d, when the striker head 59 is seated in the cavity 51a (as in Figure 13c) the movable female portion 51 will slide linearly into the latch housing body 45, as represented by straight arrow 97. The linear movement 97 ensures complete seating of the striker by allowing for further linear tolerance; simultaneously the rubber block 87 is compressed and the leading edge 93 of the shank 73 over-rotates the ratchet 77 beyond the primary engagement position wherein the detent 99 projecting from the pawl 83 securely engages the locking leg 77b of the ratchet. The compressed rubber block 87 then expands, thereby causing the movable female portion to recoil, as represented by curved arrow 101, thereby ensuring that the detent 99 seats securely in the saddle portion 103 (as in Figures 13c and 13d) of the ratchet locking leg 77b.

With reference to Figure 12, once the striker 33 is seated as in Figures 13d or 14d it is surrounded by the latch housing at least about 360° and any load exerted upon the engaged latch (as in the position of Figures 13d or 14d) is evenly distributed --for example to evenly distribute torsional forces as represented by curved arrows 105.

Referring to Figure 12b, the symmetrical lateral tapering 81 (as in Figure 3a) evenly distributes lateral forces as represented by horizontal arrows 107 and urges the end face 39 of the door 41 towards the pillar 35. Referring to Figures 12c, the symmetrical vertical tapering 63 (as in Figure 3a) evenly distributes vertical forces as represented by vertical arrows 109. It will be appreciated that the latch mechanism disclosed is appropriate for vertically opening doors such as tailgates and accordingly any references to lateral, horizontal or vertical orientation are in the context of the particular embodiment depicted.

With reference to Figure 14 there is shown a preferred embodiment of the latch mechanism described with reference to Figure 13. In the preferred embodiment shown, normally when the door 41 is ajar the movable female portion 51 proximate its end portion 85 over-extends the end 49 of the latch housing body 45. When the striker head 59 is seated in the cavity 51a (as in Figure 14c) the movable female portion 51 will slide linearly into the latch housing body 45 to a position where the movable female portion proximate its end portion 85 is substantially flush with the end 49 of the latch housing body 45 without compressing the rubber block 87 (as depicted in Figure 14d). Advantageously, the ratchet 77 is engaged by the pawl 83 in the primary locking position shown in Figure 14d --for example where the door 41 is lightly closed

without enough force to compress the rubber block 87. The linear movement of the female portion 51 allows further linear tolerance to ensure seating. Normally, where the door 41 is slammed shut, the movable female portion 51 will compress the rubber block; simultaneously the shank 73 will over-advance the ratchet 77. The recoiling of the movable female portion will ensure that the ratchet detent 99 engages the saddle 103, as is the same with reference to Figure 13d.

With reference to Figures 15, 16 and 17, striker 300 comprises a U-shaped rod 301 comprising a pair of legs 302 and 304 anchored to a base 306 and a connector rod 308 connecting the legs 302 and 304. The connector 308 and portions of the upper ends of the legs 302 and 304 connected to the connector 308 being covered by moulded plastics compressible material 310, the covered portion 310 presenting two sides 312 and 314 tapered in a direction towards apex 316 directed for entering a latch housing. The end 318 remote apex 316 is thickened. With respect to Figure 17, the two sides 314 and 312 taper in another direction 320 and 322 towards an apex directed for entering a latch housing.

With reference to Figures 18 and 19, the striker 400 comprises a pair of legs 402 and 404 anchored to base 406 and a flattened connector wire 408 connecting the legs 402 and 404, the flattened connector wire 408 presenting two sides 410 and 412 symmetrically tapered in one direction towards apex 414 directed for entering a latch housing.

With respect to Figure 19, the flattened connector is shown with the two sides 416 and 418 dotted and symmetrically tapered in an additional direction towards apex 414 directed for entering a latch housing (not shown).

With reference to Figures 20 and 21, striker 500 comprises U-shaped rod 502 comprising a pair of legs 504 and 506 each anchored to base 508 and a connector rod 510 connecting legs 504 and 506 together. Connector 510 and legs 504 and 506 comprise a one-conically-shaped piece of steel bent over to form legs 504 and 506 to provide two tapered portions tapering from leg 506 through connector rod 510 to leg 504 (and thus to apex 512 for being directed to enter a latch housing).

With reference to Figures 22 and 23, striker 600 comprises a pair of legs 602 and 604 anchored to base 606 carrying elongated wedged steel portion 608 tapering from leg 602 to leg 604. The tapered portion 608 presenting two sides 610 and 612 symmetrically tapered in one direction towards apex 614 directed for entering a latch housing.

With respect to Figures 24 and 25, striker 700 comprises a pair of L-shaped plates joined together by upstanding portions 702 and 704 to carry latch

securing aperture 706 therethrough and to which has been moulded plastic wedge portion 708 tapering from end 710 to end 712 to provide an apex 714 directed for entering a latch housing and for passing the ratchet through opening 706. It is thus clear that the steel striker 700 does not provide the tapered portion but the added moulded-on plastic portion 708 provides the wedge portions presenting the two sides 716 and 718 symmetrically tapered in one direction towards apex 714 directed for entering a latch housing.

With respect to Figures 26 and 27, references had to Figures 4 and 6 (forming part of the invention). Figure 4 is specifically referred to, and Figures 26 and 27 illustrate a variation of the structure shown in Figure 4 wherein apex 206 has been modified to carry a plastic moulded cylindrical portion 810, plastics moulding 810 is a resilient of plastics material for noise reduction purposes when the ratchet is secured to the striker.

With reference to Figures 28, 29 and 30, there is shown one piece striker 900 having generally the same configuration as striker 71 shown in Figure 4 and comprises mounting plate 902 and 904 carrying mounting apertures 906 and 908 respectively, and upstanding wedge-shaped striker 910 tapered from a broader portion at 912 to a narrower portion 914 which forms the apex. Striker 900 is manufactured from one piece of steel plate and comprises the one piece having a length greater than its width and positioned to extend longitudinally, one edge portion of which has a 920 being bent to a position normal to the plate portions 902 and 904 forming the base, the plate being cut intermediate its ends at 922 (see Figure 28 when the cut portions are separated), cut 922 extending from proximate the edge opposite the bent portion (which forms upstanding portion 910, to proximate the bent portion 910. Ends 910A and 910B are brought together as shown in Figure 28 and secured together forming a wedge portion tapering from wider portion 912 to apex 914. Ends 910A and 910B are welded together.

With reference to Figures 31 and 32, there is shown striker 1000 comprising base plate 1002 carrying twin apertures 1004 and 1006 for receiving bushings 1008 and 1010 each covered by a plastic bushing 1012 and 1014, the upper ends of which support wedge-shaped upper plate 1016 through which screws 1020 are secured into bushings 1008 and 1010. Sheet metal 1022 is shown to which striker 1000 is secured by fastening plate 1024.

Striker 1050 shown in Figure 32 carries wedge-shaped upper portion 1052 secured to the base plate 1002 in a similar manner to which wedge-shaped plate 1016 is secured. Portion 1052 is deep drawn or cold formed at its side edges to provide a "thick r" tapered upper plate portion as at 1054

surrounding thinner top portion 1056.

With reference to Figure 32, the thicker portion extends downwardly from portion 1056.

With reference to Figure 33, thicker portion 1054' extends upwardly from portion 1056'. Mounting screws 1060 secure the tapered upper portion 1052' to bushings 1008' and 1010'.

With reference to Figure 34, striker 1070 comprises portions 1072 and 1074 bent intermediate its ends to form upstanding portions 1073 and 1075 which are joined together along line or plane 1076. Portions 1072A and 1074A carry mounting apertures 1078 and 1080 respectively. Upstanding portions 1073 and 1075 carry latch-receiving apertures therethrough (not shown). The portions of upstanding portions 1073 and 1075 on the side of the latch-receiving apertures' remote surfaces 1072A and 1074A are stamped or bent in a manner to provide wedge-shaped portions 1073' and 1075' which when joined together present the tapered portion of the striker. Where portions 1073' and 1075' join, the end portions 1084 and 1088 are parallel to one another and are joined together. The other ends of portions 1073' and 1075' are connected to portions 1088 and 1090 respectively which extend parallel to one another and joint plane 1076. The rear end of portions 1088 and 1090 are connected to rearwardly-tapered portions 1092 and 1094 respectively which are connected by connector end portions 1096 and 1098. As can be seen in Figure 34, striker 1070 is positioned in a latch housing 1100, only part of which is shown. As is also apparent, not all of the locking portions of the striker 1070 engage the walls of latch housing 1100 but were specifically structured with respect to latch housing 1100 as at 1073' not to engage the latch housing in area 1102 to provide a clearance between the striker 1070 and latch housing 1100 at 1102 in fully closed (inserted) position to minimize force required to insert and remove the striker from the housing to which it is secured.

With reference to Figure 34, the configuration of both functional portions of the striker for insertion in the latch housing is symmetrical.

With reference to Figures 35 and 36, such functional portions are not symmetrical.

With reference to Figure 35, portions 1073' and 1075' are provided. However whereas portion 1090' is parallel to joint plane 1076', portion 1088' is V-shaped. Furthermore, connecting portions 1096' and 1098' are offset relative to plane 1076'.

With reference to Figure 36, portions 1073'' and 1075'' are not tapered symmetrically, portion 1088'' is V-shaped, portion 1090'' is parallel to joint line 1076'', and connectors 1096'' and 1098'' are similar to portions 1096 and 1098.

Claims

1. A striker for a vehicle door locking mechanism, the striker comprising a head providing a base and sloping sides symmetrically tapered in at least two directions towards an apex directed to enter a latch housing; the striker having a shank for mounting the striker, the shank extending away from the striker head.

2. A striker for a vehicle door locking mechanism, the striker comprising a head providing a base and sloping sides symmetrically tapered in at least two directions towards an apex directed to enter a latch housing; the striker having a shank for mounting the striker, the shank extending laterally away from one side of the striker head for sliding engagement with a slot extending longitudinally along one side of a latch housing.

3. The striker of Claim 1 wherein the striker head providing a base and sloping sides symmetrically tapered in at least two directions towards an apex, is of a generally frustum trapezoidal configuration.

4. The striker of Claim 2 wherein the striker head providing a base and sloping sides symmetrically tapered in at least two directions towards an apex, is of a generally frustum trapezoidal configuration.

5. A latch housing for a vehicle door locking mechanism, the latch housing comprising a body having at least one side open of a configuration for receiving a movable female portion of compatible configuration; the movable female portion having an external configuration suitable for fitting telescopically inside the opening in the latch housing and being reversably slideable therein, the movable female portion having an inside surface of a configuration matching the configuration of a striker head and suitable for surrounding the striker head at least about 360°, the movable female portion suitable for receiving a striker head in a tolerance fit, the latch housing having a means for limiting the slideable retraction of the movable female portion into the latch housing and limiting the extension of the movable female portion out of the latch housing; whereby the movable female portion suitable for receiving the striker head in a tolerance fit is only slideable for linear movement in the latch housing when a striker head is completely seated in the female portion.

6. A latch housing for a vehicle door locking mechanism, the latch housing comprising a body having at least one side open of a configuration for receiving a movable female portion of compatible configuration and one side perpendicular to the said opening having a slot extending longitudinally suitable for slideably receiving the shank of a striker; the movable female portion having an external

configuration suitable for fitting telescopically inside the opening in the latch housing and being reversably slideable therein, the movable female portion having an inside surface of a configuration matching the configuration of a striker head and suitable for surrounding the striker head at least about 360°, the movable female portion having a slot extending longitudinally on one side parallel and adjacent to the slot on one side of the latch housing for slideably receiving the shank of the striker, the movable female portion suitable for receiving the striker head in a tolerance fit, the latch housing having a means for limiting the slideable retraction of the movable female portion into the latch housing and limiting the extension of the movable female portion out of the latch housing; whereby the movable female portion suitable for receiving the striker head in a tolerance fit is only slideable for linear movement in the latch housing when a striker head is completely seated in a female portion.

7. A vehicle door locking mechanism for releasably locking a vehicle door in a closed position, the mechanism comprising:

a) a striker securely mounted on either of a pillar or a door, suitable for slideably engaging a latch housing; the striker having a head providing a base and sloping sides symmetrically tapered in at least two directions, towards an apex directed to enter a latch housing; the striker having a shank for mounting the striker, the shank extending away from the striker head;

b) a latch housing securely mounted on either of a pillar or a door, suitable for slideably receiving the striker of (a); the latch housing comprising a body having at least one side open of a configuration for receiving a movable female portion of compatible configuration; the movable female portion having an external configuration suitable for fitting telescopically inside the opening in the latch housing and being reversably slideable therein, the movable female portion having an inside surface of a configuration matching the configuration of the striker head and suitable for surrounding the striker head at least about 360°, the movable female portion suitable for receiving the striker head in a tolerance fit, the latch housing having a means for limiting the slideable retraction of the movable female portion into the latch housing and limiting the extension of the movable female portion out of the latch housing;

c) ratchet means for engaging the striker suitable for locking the striker inside the latch housing and suitable for releasing the striker for permitting the slideable movement of the striker out of the latch housing.

8. A vehicle door locking mechanism for releasably locking a vehicle door in a closed position, the mechanism comprising:

a) a striker securely mounted on either of a pillar or a door, suitable for slideably engaging a latch housing; the striker having a head providing a base and sloping sides symmetrically tapered in at least two directions, towards an apex directed to enter a latch housing; the striker having a shank for mounting the striker, the shank extending laterally away from one side of the striker head for sliding engagement with a slot extending longitudinally along one side of a latch housing;

b) a latch housing securely mounted on either of a pillar or a door, suitable for slideably receiving the striker of (a); the latch housing comprising a body having at least one side open of a configuration for receiving a movable female portion of compatible configuration and one side perpendicular to the said opening having a slot extending longitudinally suitable for slideably receiving the shank of the striker; the movable female portion having an external configuration suitable for fitting telescopically inside the opening in the latch housing and being reversably slideable therein, the movable female portion having an inside surface of a configuration matching the configuration of the striker head and suitable for surrounding the striker head at least about 360°, the movable female portion having a slot extending longitudinally one side parallel and adjacent to the slot on one side parallel and adjacent to the slot on one side of the latch housing for slideably receiving the shank of the striker, the movable female portion suitable for receiving the striker head in a tolerance fit, the latch housing having a means for limiting the slideable retraction of the movable female portion into the latch housing and limiting the extension of the movable female portion out of the latch housing;

c) ratchet means for engaging the striker suitable for locking the striker inside the latch housing and suitable for releasing the striker for permitting the slideable movement of the striker out of the latch housing.

9. The door locking mechanism of Claim 7 or 8 wherein the latch housing comprises a body having an opening for access to a generally rectangular internal configuration for receiving the movable female portion of compatible configuration comprising a generally rectangular external configuration suitable for fitting telescopically inside the opening in the latch housing and being releasably slideable therein.

10. The door locking mechanism of Claim 7 or 8 wherein the movable female portion has an inside configuration of a generally frustum trapezoidal configuration matching the frustum trapezoidal shape of the striker head.

11. The door locking mechanism of Claim 7 or 8 wherein the ratchet means for engaging the striker is suitable for locking the striker inside the latch housing only when the striker head is completely seated in the movable female portion whereby the movable female portion of the latch housing when struck by the striker only slides into the latch housing when the striker head is completely seated therein, thereby providing tolerance for the engagement of the striker head inside the movable female portion and alignment of the ratchet means with the striker.

12. The striker of Claims 2 and 8 wherein the shank of the striker extending laterally away from one side of the striker head for sliding engagement with a slot extending longitudinally along one side of a latch housing, comprises a hole directed there-through suitable for receiving at least one leg of a ratchet for releasably locking the striker inside a latch housing.

13. A vehicle door locking mechanism for releasably locking a vehicle door in a closed position, the mechanism comprising:

a) a striker securely mounted on either of a pillar or a door, suitable for slideably engaging a latch housing; the striker having a head symmetrically tapered in at least two directions, of a generally frustum trapezoidal configuration having an apex directed towards a latch housing; the striker head having a shank for mounting the striker, the shank extending laterally away from one side of the striker head for sliding engagement with a slot extending longitudinally along one side of a latch housing;

b) a latch housing securely mounted on either of a pillar or a door, suitable for slideably receiving the striker of (a); the latch housing comprising a body of a generally rectangular internal configuration having at least one side open for receiving a movable female portion and one side perpendicular to the said opening having a slot extending longitudinally suitable for slideably receiving the shank of the striker; the movable female portion having a generally rectangular external configuration suitable for fitting telescopically inside the opening in the latch housing and being reversably slideable therein, the movable female portion having an inside surface of a generally frustum trapezoidal configuration matching the configuration of the striker head suitable for surrounding the striker head at least about 360° and having a slot extending longitudinally on one side parallel and adjacent to the slot on one side of the latch housing for slideably receiving the shank of the striker, the movable female portion suitable for receiving the striker head in a tolerance fit and being slideable for linear movement in the latch housing only when the striker head is completely seated in the

female portion, the latch housing having a means for limiting the slideable retraction of the movable female portion into the latch housing and limiting the extension of the movable female portion out of the latch housing;

c) ratchet means for engaging the striker suitable for locking the striker inside the latch housing only when the striker head is completely seated in the movable female portion and suitable for releasing the striker for permitting the slideable movement of the striker out of the latch housing;

d) whereby the movable female portion of the latch housing when struck by the striker only slides into the latch housing when the striker head is completely seated therein thereby providing tolerance for the engagement of the striker head inside the movable female portion and alignment of the ratchet means with the striker.

14. The vehicle door locking mechanism of Claim 7, 8 or 13 wherein the means for limiting the slideable retraction of the movable female portion into the latch housing comprises resilient biasing means suitable for absorbing the kinetic force of the striker when moving the female portion in a linear direction upon closure of the door and suitable for causing the movable female portion to thereafter recoil.

15. A striker comprising two rectangular portions each having two opposed end edges and carrying a mounting aperture and a latch-receiving aperture, the two rectangular portions each being bent intermediate its end edges and disposed normal to one another, the portion between the edge of the latch-receiving aperture remote the bend and closest end edge to the latch-receiving aperture is curved laterally in a direction away from the plane of the bent portion containing the latch-receiving aperture in a direction towards the portion containing the mounting aperture whereby when the two portions containing the latch-receiving aperture are aligned and joined together, the end of the striker provides two symmetrical laterally extending curved portions tapered towards an apex directed for centering a latch housing.

16. The striker of Claim 15, wherein the curved portion is tapered from a wider section to a narrower portion towards the apex provided for entering a latch housing.

17. The striker of Claim 15 or 16 is covered by compressible moulded plastics material.

18. A striker comprising a U-shaped rod comprising a pair of legs anchored to a base and a connector rod connecting the legs, the connector and portions of the upper ends of the legs connected to the connector being covered by compressible moulded plastics material, the covered

portion presenting two sides tapered in at least one direction towards an apex directed to entering a latch housing.

19. The striker of Claim 18, wherein the at least two sides taper in at least two directions towards an apex directed for entering a latch housing.

20. A striker comprising a pair of legs anchored to a base and a flattened connector wire connecting the legs, the flattened connector wire presenting at least two sides symmetrically tapered in at least one direction towards an apex directed to entering a latch housing.

21. The striker of Claim 20, wherein the flattened connector is symmetrically tapered in at least two directions towards an apex directed for entering a latch housing.

22. A striker presenting two sides symmetrically tapered in at least two directions towards an apex directed for entering a latch housing.

23. A striker presenting a compressible plastics portion presenting two sides symmetrically tapered in at least one direction towards an apex.

24. The striker of Claim 23, wherein the plastics portion presents two sides symmetrically tapered in at least two directions.

25. A striker comprising a generally U-shaped rod anchored to a base, at least a portion of the U-shaped rod being conically tapered, presenting two sides tapering in two directions towards an apex directed for entering a latch housing.

26. The striker of Claim 25 wherein the conical tapering extends from one end to the other end of the U-shaped rod.

27. A striker comprising a generally U-shaped rod anchored to a base, at least a portion of the U-shaped rod carrying an elongated wedge portion.

28. The striker of Claim 27 wherein the elongated wedge portion extends from one end to the other end of the U-shaped rod.

29. A striker comprising two rectangular portions, each having two opposed end edges and carrying a mounting aperture and latch receiving aperture, the two rectangular portions each being bent intermediate its end edges and disposed normal to one another, the two portions containing the latch-receiving aperture are aligned and joined together, the said two portions at least partially encapsulated by material to present a wedge shaped portion for tapering towards an apex directed for entering a latch housing.

30. The striker of Claim 29 wherein the material used for the encapsulation comprises a plastics material.

31. The striker of Claim 29 or 30 wherein the encapsulated material presents two sides symmetrically tapered in at least two directions towards the apex.

32. A one-piece striker made from one sheet of material, the striker comprising a mounting plate carrying a pair of mounting apertures therethrough and an upstanding latch-receiving formation, the formation comprising a latch-receiving aperture therethrough, one end being wider than the other end to provide at least one wedge portion tapering towards an apex directed for centering a latch housing and for securing the latch to the striker.

33. The one-piece striker of Claim 32 wherein the at least one wedge portion comprises a pair of wedge portions each tapering towards the apex.

34. The one-piece striker of Claim 32 or 33 made from a single plate extending longitudinally, an edge portion being bent to a position normal to the plate, the plate being cut intermediate its ends from the edge opposite the bent portion to approximate the bent portion bending the ends of the bent edge portion together to form the at least one wedge portion and securing the ends together.

35. A striker comprising two rectangular portions each having two opposed end edges and carrying a mounting aperture and a latch-receiving aperture for receiving a latch, the two rectangular portions each being bent intermediate their end edges and disposed normal (substantially 90 degrees) to one another, the portion between the edge of the latch-receiving aperture remote the bend and closer end edge to the latch-receiving aperture is curved laterally in a direction away from the plane of the bent portion containing the latch-receiving aperture in a direction parallel the portion containing the mounting aperture whereby when the two portions containing the latch-receiving aperture are aligned and joined together, the end of the striker provides two symmetrical laterally-extending curved portions tapered towards an apex directed for centering in a latch housing.

36. The striker of Claim 35 wherein the apex carries compressible moulded plastics material for noise reduction purposes.

37. The striker of Claim 35 wherein the bent or curved portion is tapered from a wider section to a narrower portion towards the apex provided for entering a latch housing.

38. The striker of Claim 37 wherein the bent or curved portions are tapered in two directions.

39. A striker comprising two portions (for example, rectangular in shape) each having two opposed end edges and carrying a mounting aperture and a latch-receiving aperture for receiving a latch, the two portions each being bent intermediate their end edges and disposed normal (substantially 90 degrees) to one another at least one of the portions in the area between the edge of the latch-receiving aperture remote the bend and closer end edge to the latch-receiving aperture is bent laterally (for example, curved laterally) in a direction away from

the plane of the bent portion containing the latch-receiving aperture in a direction parallel the portion containing the mounting aperture whereby when the two portions containing the latch-receiving aperture are aligned and joined together along a joint, the end of the striker provides at least one laterally extending portion tapering towards an apex.

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40. The striker of Claim 39 wherein the striker provides two unsymmetrical laterally-extending portions tapering towards an apex.

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41. The striker of Claim 39 wherein the striker provides two symmetrical laterally-extending portions tapering towards an apex directed for centering in a latch housing.

42. The striker of Claim 39, 40 or 41 wherein an intermediate portion of the bent or curved portions may be parallel to the joint.

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43. The striker of Claim 39, 40 or 41 wherein an intermediate portion of the bent or curved portion may be V-shaped directed away from the joint.

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44. The striker of Claim 38,39,40,41 or 42 wherein the bent or curved portions of the striker carry portions which do not engage the latch housing when inserted therein to minimize forces required to insert the striker into the latch housing.

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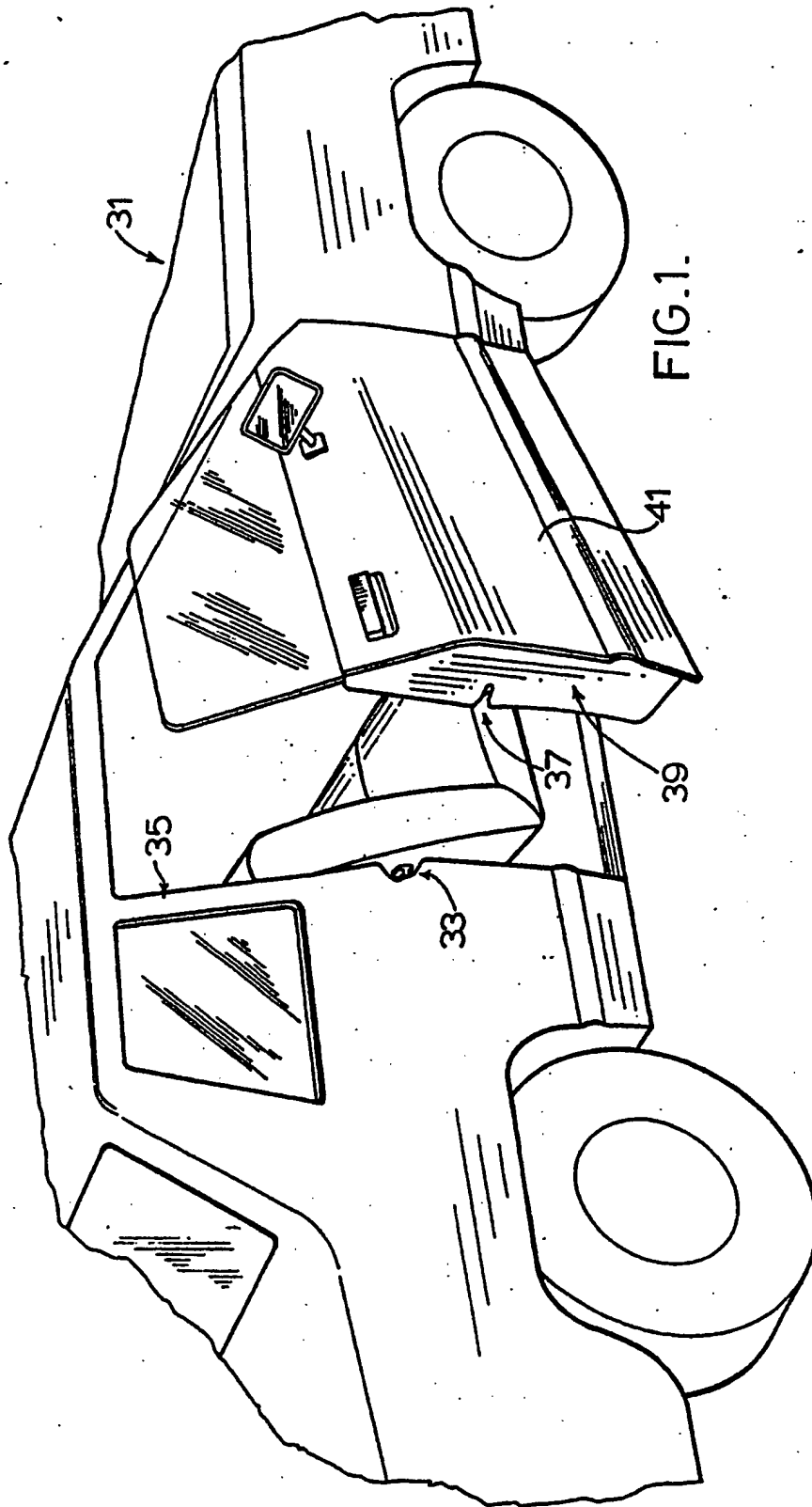


FIG. 3.

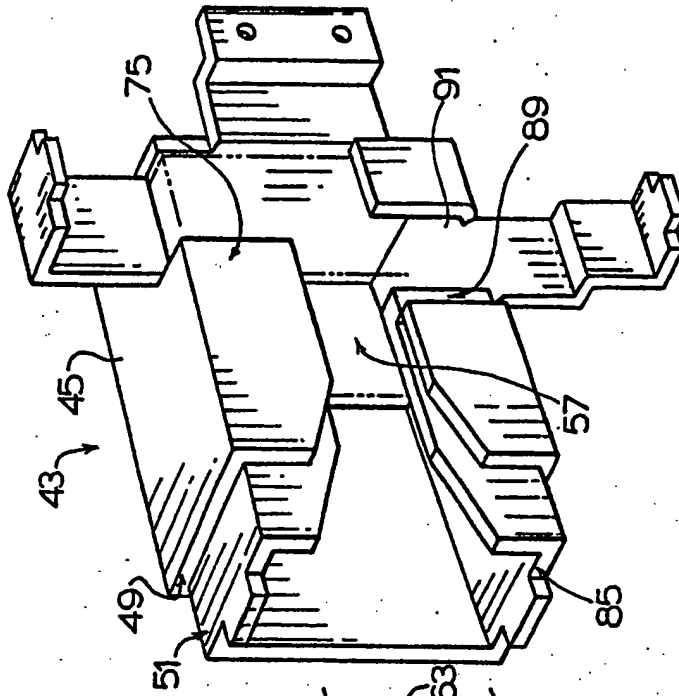
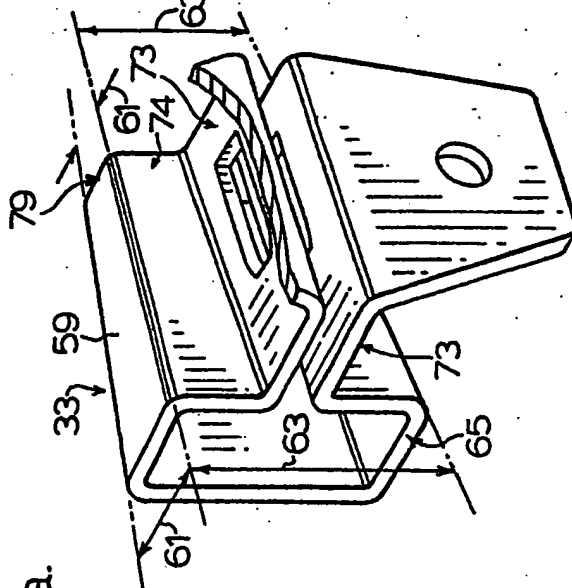


FIG. 3a.



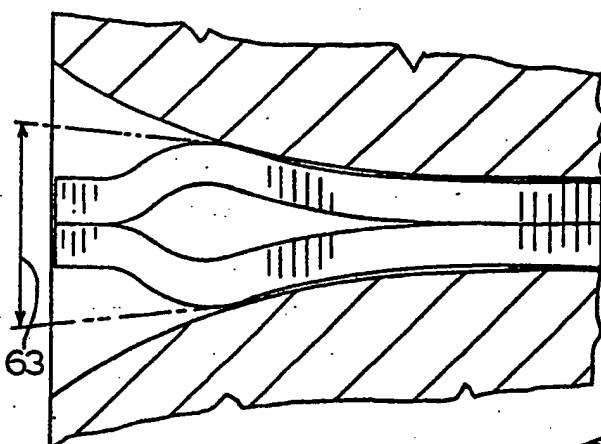
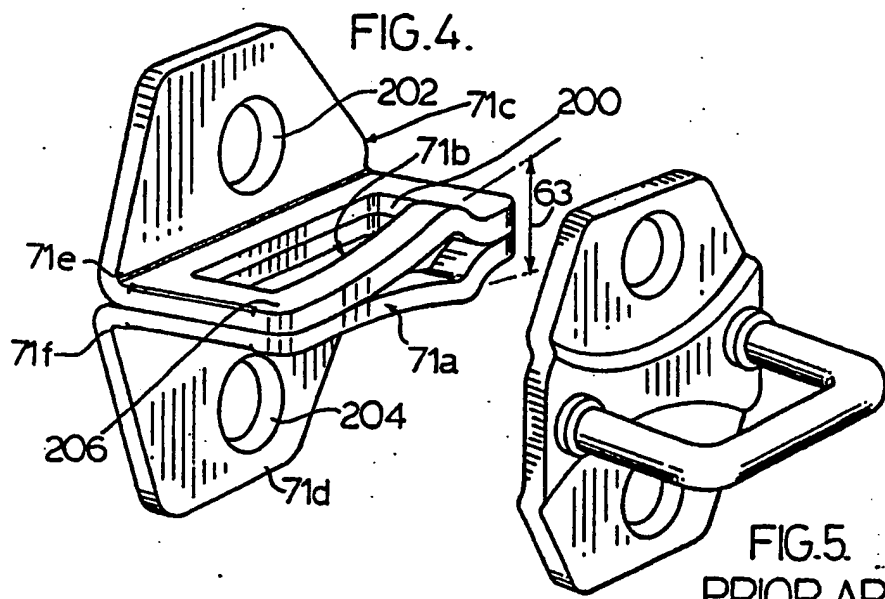
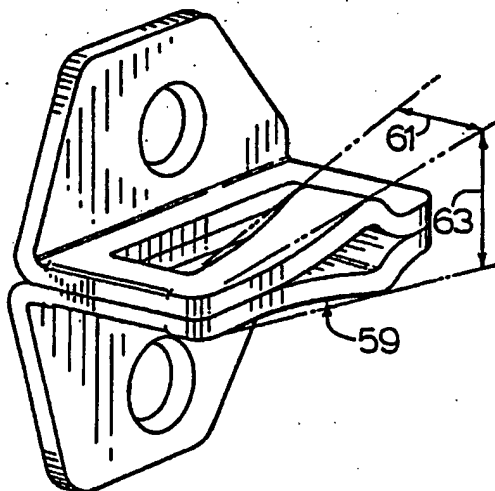
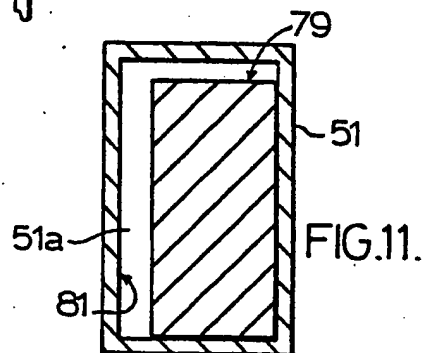
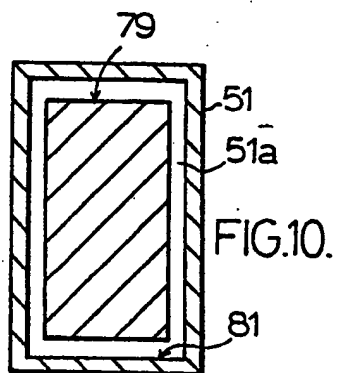
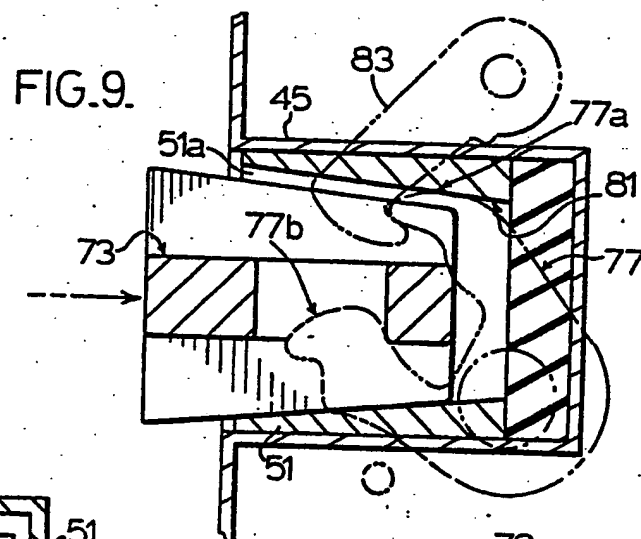
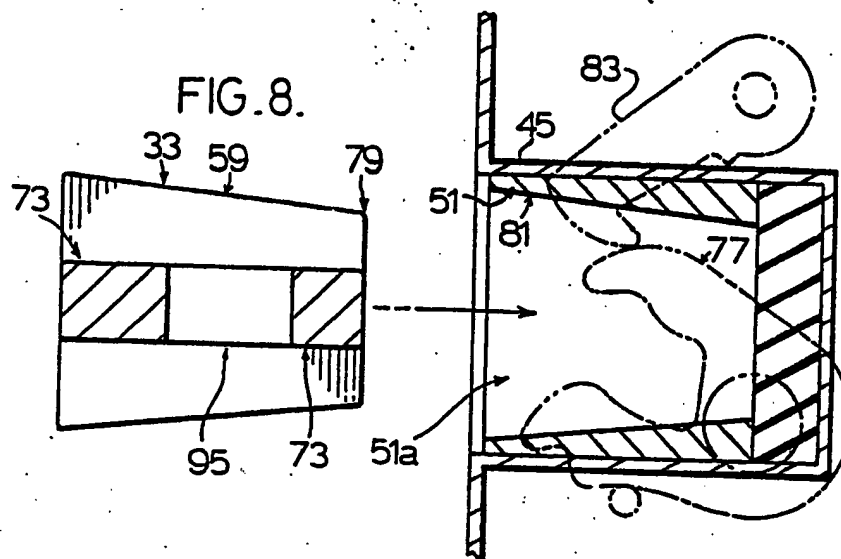


FIG.6.

FIG.7.





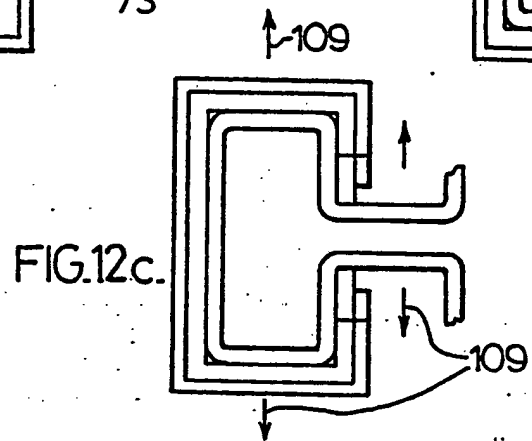
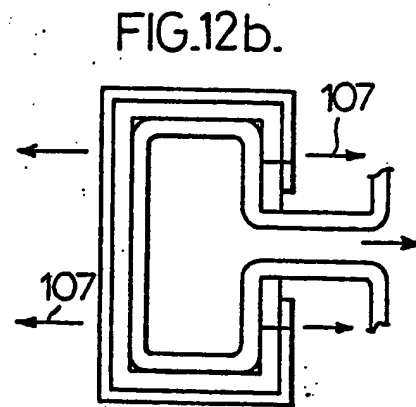
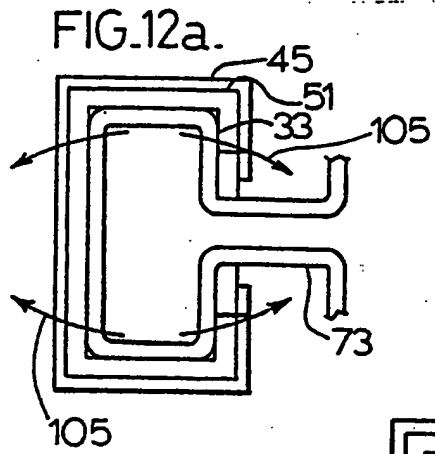


FIG.13a.

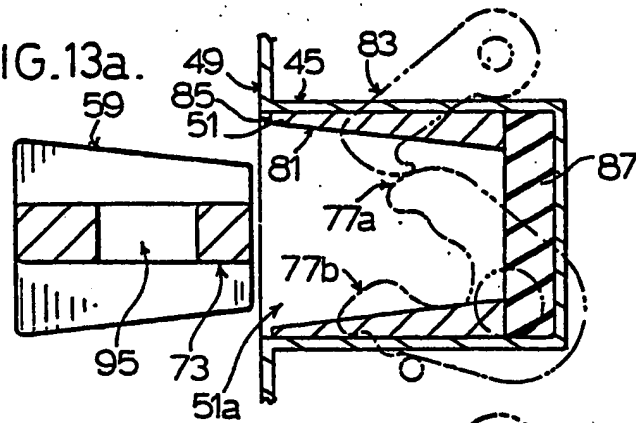


FIG.13b.

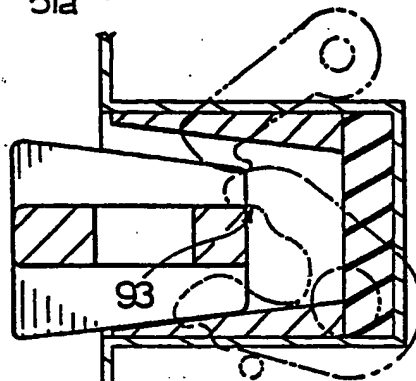


FIG.13c.

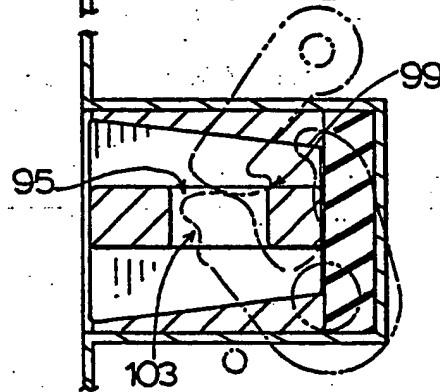
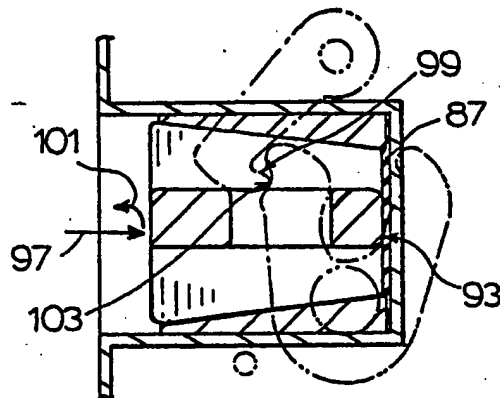


FIG.13d.



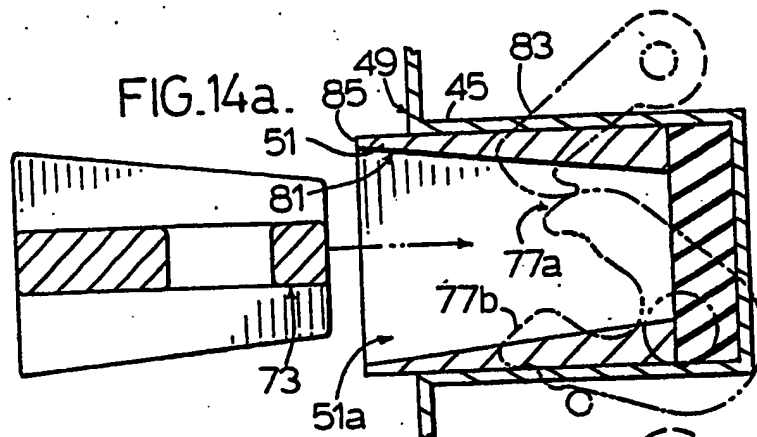


FIG.14b.

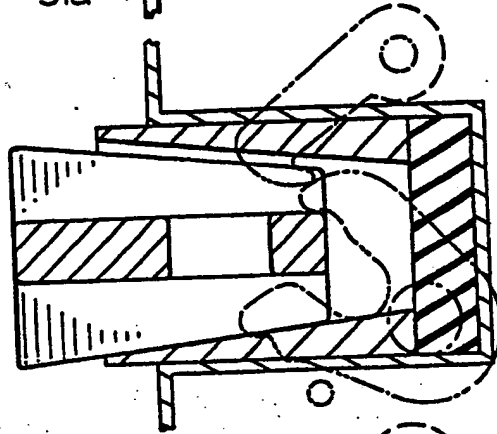


FIG.14c.

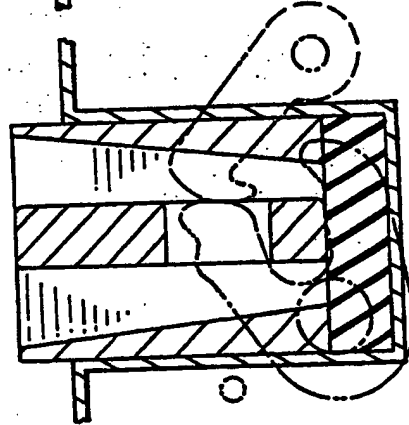


FIG.14d.

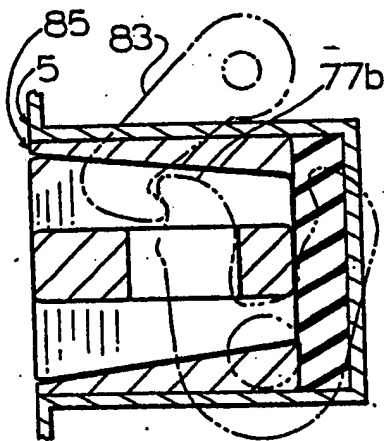


FIG.14e.

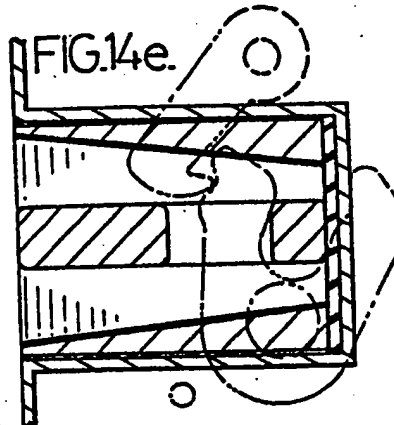


FIG.15.

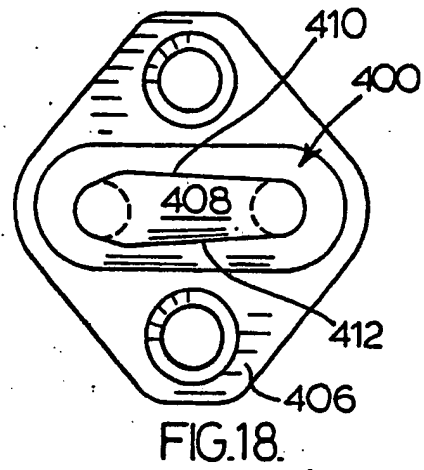
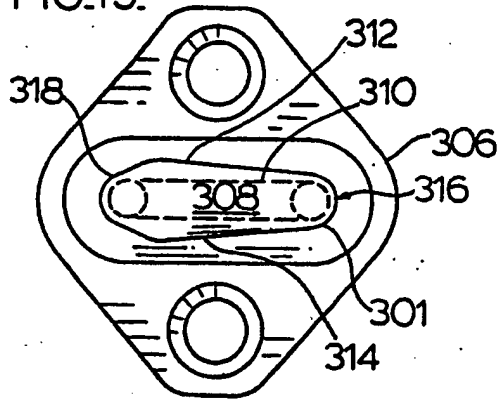


FIG.16.

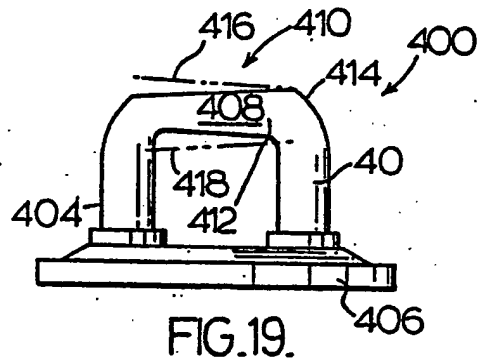
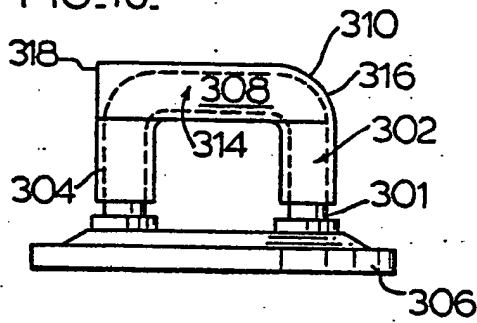
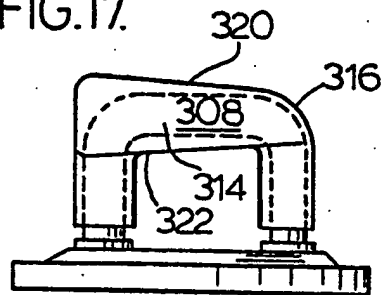


FIG.17.



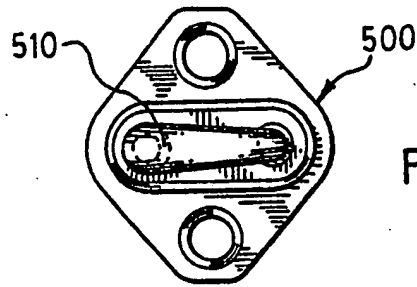


FIG. 21.

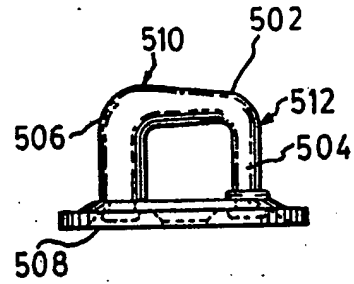


FIG. 20.

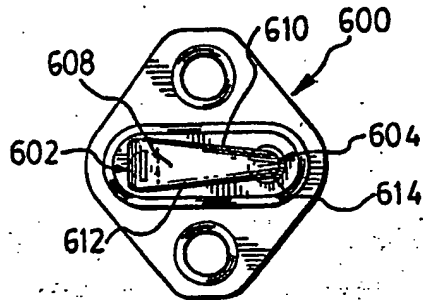


FIG. 23.

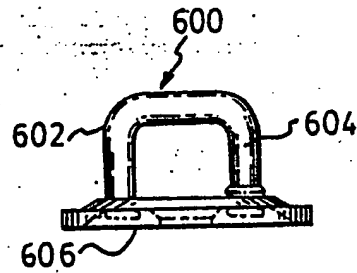


FIG. 22.

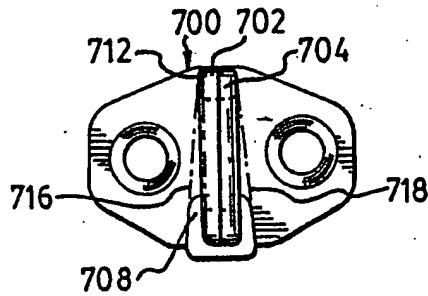


FIG. 25.

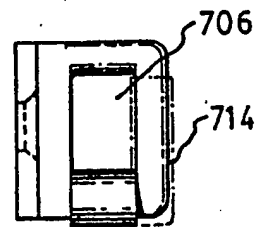


FIG. 24.

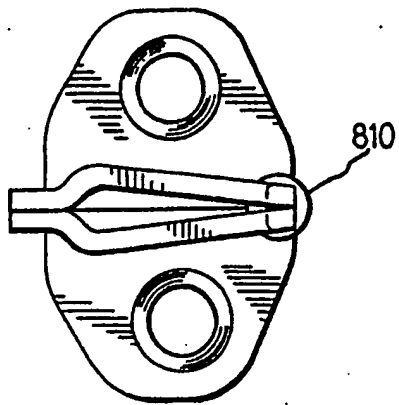


FIG. 26.

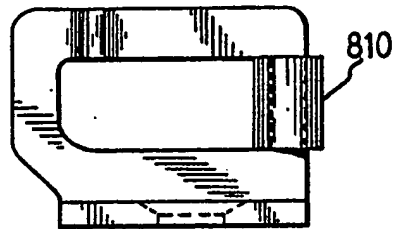


FIG. 27.

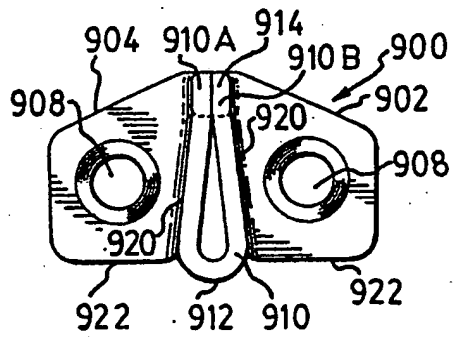


FIG. 28.

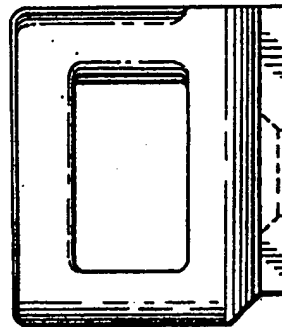


FIG. 30.

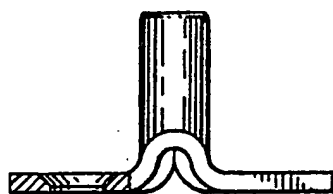


FIG. 29.

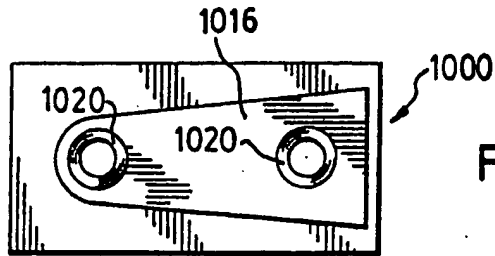


FIG. 31A

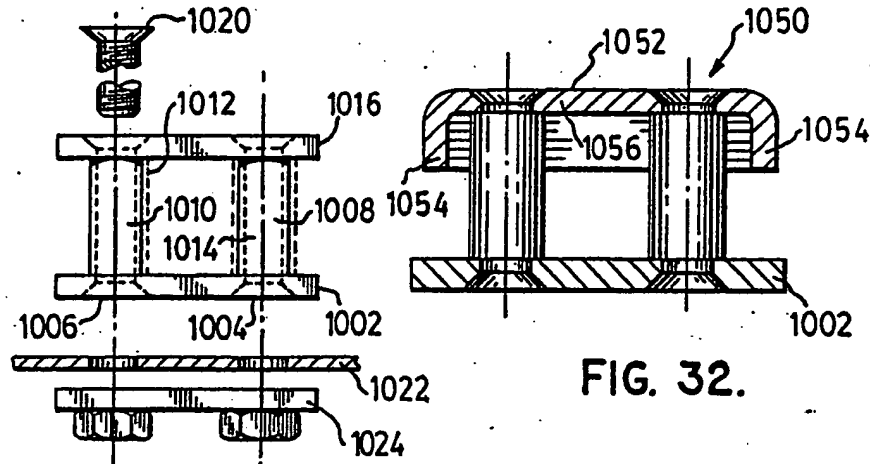


FIG. 32.

FIG. 31B.

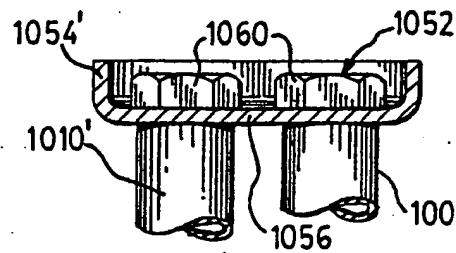


FIG. 33.

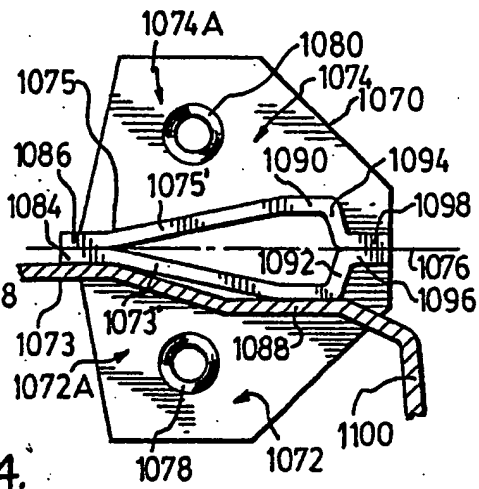


FIG. 34.

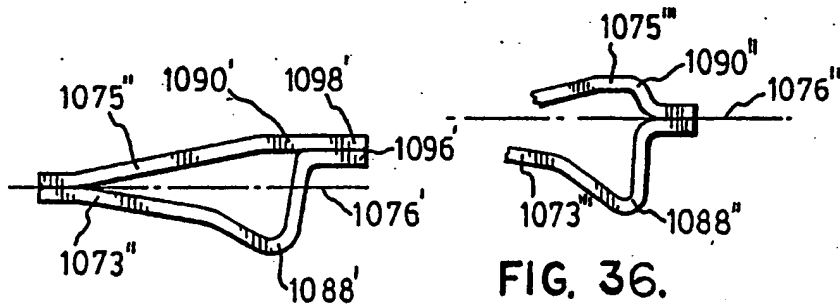


FIG. 35.

FIG. 36.



DOCUMENTS CONSIDERED TO BE RELEVANT			EP 87311106.6
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
D,A	US - A - 3 674 296 (WANLASS) * Claims 1-3; fig. 1-3 * --	1-3,5- 7,10- 14,26, 28,29	E 05 B 65/12
D,A	US - A - 4 357 039 (TÖLLE) * Claims 1-10; fig. 1-4 * --	1,2,5- 9,12- 18	
D,A	US - A - 4 358 141 (HAMADA) * Claims 2-10; fig. 1-9 * --	1,2,5	
D,A	US - A - 3 367 699 (J.D.LESLIE) * Claims 1-9; fig. 1-7 * --	1,5	
D,A	US - A - 1 192 733 (BENNETT) * Claims 1-6; fig. 1-6 * --	1-5,7- 9,10- 14,16, 22,29, 32-35, 37,39, 40,41, 43,44	TECHNICAL FIELDS SEARCHED (Int. Cl.4) E 05 B
D,A	US - A - 2 758 864 (M.DIXON) * Claims 1-3; fig. 1-6 * --	1,2,5- 12,14- 16,19, 31-33, 38-44	
D,A	GB - A - 239 691 (BUNN) * Claims 1-7; fig. 1-5 * --	1-4	
D,A	US - A - 4 466 645 (KOBAYASHI) * Claims 1-2; fig. 1-5 * ----	1,2,5- 11,13- 15,18, 23,25- 27,28- 30	
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 08-02-1988	Examiner CZASTKA
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published n, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			